Specifications

Physical Description

For bed specifications, see table 1-1 on page 1-16.

Table 1-1. Specifications

Feature	Dimension
Total Length	90" (229 cm)
Length from roller bumpers to break in seat section	61 7/8" (157 cm)
Length from break in the seat section to end of bed	28 1/8" (71 cm)
Maximum Width (siderails stored)	36" (91 cm)
Maximum Width (siderails up)	39" (99 cm)
Maximum Headboard Height	52" (132 cm)
Maximum Siderail Height (without mattress)	14¾" (37.47 cm)
Minimum Under-Bed Clearance	5" (13 cm), 3" 7.6 cm) for Stow and Go™ Beds
Wheel Base	50" x 29" (127 cm x 74 cm)
Mattress Width	35" (89 cm)
Mattress Length	78" (198 cm)
Mattress Thickness (head/seat)	4" (10 cm)
Mattress Thickness (foot)	3" (8 cm)
Detachable Power Cord, IEC 320/interface	US, 84" (213 cm)/international, 98" (249 cm)
Caster Size	6" (15 cm) or 8" (20 cm) (Affinity® Three Birthing Bed only)
Total Weight (maximum)	480 lb (218 kg)
Head Section Inclination (maximum)	65°
Seat Section Inclination (maximum)	15°
Bed Height Range	18" (46 cm) to 34" (86 cm)
Bed Height Range (with mattress)	22" (56 cm) to 38" (97 cm)
Trend-Like position (maximum)	8°

(Continued on next page.)

Table 1-1. Specifications *(cont'd.)*

Feature	Dimension
Bed Lift capacity (maximum safe working load)	500 lb (227 kg)
Foot Section Weight capacity (maximum)	400 lb (181 kg)
Head Section Lift capacity (maximum)	200 lb (91 kg)
Maximum Height of Seat Section (in Trend-Like position)	40" (102 cm)

Table 1-2. Environmental Conditions for Transport and Storage

Condition	Range
Temperature	-40°F (-40°C) to 158°F (70°C)
Relative humidity	95% non-condensing
Pressure	15 "Hg (50 kPa) to 31 "Hg (106 kPa)

Table 1-3. Environmental Conditions for Use

Condition	Range
Temperature	59°F (15°C) to 104°F (40°C) ambient temperature
Relative humidity range	10% to 85% non-condensing

Electrical Description

Table 1-4. Mains Power Requirements

Condition	Range
Rated voltage	120V AC/230V AC
Power/input	4 A/2 A
Frequency	50/60 Hz

Table 1-5. Fuse Specifications

Condition	Range
Air system fuse (air system optional)	2 A, 250 V~, 5 x 20 mm, UL 198G Fast Acting
Battery fuse	10 A, 32 V~, ATO
Mains fuses (120 V bed model)	4 A, 125 V~, 5 x 20 mm, UL 198G Slo-Blo®[a] or equivalent
Mains fuses (230 V bed model)	2 A, 250 V~, 5 x 20 mm, IEC127 Sheet III, Time Delay

a. Slo-Blo® is a registered trademark of Littelfuse, Inc.

Table 1-6. Electrical Leakage

Condition	Range
Ground resistance	< 0.20Ω
Leakage current	< 100µA for 120V models < 150µA for 230V models

The electrical power system is insulated from the metal parts of the bed. No additional electrical components, such as isolation transformers, are required to make this bed meet applicable electrical codes. All patient support surfaces are fully grounded through a three-wire power cord having a hospital-grade, 3-prong, grounded plug.

Each bed is factory-tested for complete operation with and without a load. Each bed is tested for insulation integrity and micro-current leakage.

All electrical components of this bed have been approved by Underwriters Laboratories Inc.®[1] (UL) and Canadian Standards Association (CSA®[2]) for this application.

Automatic Night Light

The bed is equipped with a night light that automatically activates as the ambient light decreases. The light illuminates the foot fall area under the bed.

1. Underwriters Laboratories Inc.® is a registered trademark of Underwriters Laboratories Inc.
2. CSA® is a registered trademark of Canadian Standards Association

Siderail Controls

Patients and attendants operate the various functions of this bed by means of finger-touch switches located in a convenient fixed position on the siderails at both sides of the bed. These controls move with the head section for easy access and visual contact regardless of the head section elevation. The control switches are electronically interlocked to prevent electrical damage to the motor caused by contradictory direction signaling.

Head

Head section operating controls, identified by graphic symbols, are visible and accessible to both the patient and the attendant. The up/down travel of the head section is controlled by separate momentary type switches.

Foot

Foot section operating controls, identified by graphic symbols, are visible and accessible to both the patient and the attendant. The up/down travel of the foot section is controlled by separate momentary type switches.

On the original version of the bed, the foot section travel pauses when it reaches the flat or bed level position, indicating the bed is in the level position. Travel then proceeds to the desired position if the foot section switch remains actuated. The new version of the bed does not have this pause feature.

Hilow

The hilow controls, identified by graphic symbols, are visible and accessible only to the nurse/attendant. The up/down travel of the sleep deck is controlled by separate momentary type switches.

Lockout

This bed has the capability of locking out the inboard and outboard hilow, head, and foot functions if so prescribed by the attending physician. The lockout switch is located at the head end of the bed's main frame. The lockout function interrupts the patient/attendant siderail controls until the lockout switch is turned off.

P.C. Boards

All P.C. board functions are tested at the completion of circuit board assembly and at final bed assembly. A line transient filter is included to protect the boards from excessive line surges.

Regulations, Standards, and Codes

The bed is designed and manufactured according to equipment classifications and the standards in table 1-7 on page 1-20.

Table 1-7. Regulations, Standards, and Codes

Technical and Quality Assurance Standards	EN 60601-1 and amendments UL 2601-1 CSA C22.2 No. 601.1 IEC 60601-2-38 IEC 60601-1-2 EN ISO 9001 and EN 46001
Equipment Classifications per EN 60601-1	Class I equipment, internally powered equipment
Degree of Protection Against Electric Shock of the Applied Part	Type B
Degree of Protection Against Ingress of Water	IPX2
Degree of Protection Against the Presence of Flammable Anaesthetic Mixtures	Ordinary equipment, not for use in a flammable atmosphere
Mode of Operation	Continuous operation with intermittent loading, 3 minutes ON/30 minutes OFF
Classification according to Directive 93/42/EEC	Class I

Model Identification

For bed model identification, see table 1-8 on page 1-20.

Table 1-8. Model Identification

Model Number	Description
P3700A	Affinity® Three Birthing Bed
P3700B	Affinity® Four Birthing Bed

Safety Tips

Train and educate your staff on the hazards associated with electric beds. Do not allow personnel to have their entire body below the sleep surface and within the confines of the bed. Unplug the bed from its power source and engage the lockout control prior to cleaning or servicing it. If service personnel need to get under the bed, they must block up the hilow portion as an added precaution. Ensure that the foot section is properly mounted to the yoke.

We urge you to incorporate these safety tips into your procedures for the safety of both patients and staff.

Bed Position

To reduce the severity of falls by patients, always leave the bed in the low position when the patient is unattended.

Siderails

Leave the siderails fully up and locked when the patient is left unattended. When raising the siderails, be sure that you hear the click that signals the up and locked condition. Give the siderails a tug to check that they are firmly in position.

Siderails are intended as a reminder, not a restraint device. Appropriate medical personnel should determine the level of restraint necessary to ensure a patient remains safely in bed.

Brake and Steer Pedals

Always keep the casters in the brake position when the bed is occupied. Patients often use the bed for support when getting in or out of bed, and serious injuries can result if the bed moves. After brakes are set, rock the bed gently to ensure that they are locked.

Put the casters in the steer mode when moving the bed. This will make the bed easier to position or transport.

Fluids

When massive spills occur in the area of the P.C. boards, motors, or transformers, immediately:

1. Unplug the bed from its power source.
2. Take care of the patient.
3. Clean the fluid from the bed.
4. Have maintenance check out the bed completely. Fluids can short out controls, making the bed inoperable or cause the bed to operate erratically. Component failure caused by fluids can even cause the bed to operate without warning, causing injury.
5. Do not place the bed back into service until it is unquestionably dry and tested safe to operate.

Water Mattress

The excessive weight associated with water mattresses puts an undue stress on the motor drives. In most cases, the patient's weight plus the water mattress weight exceeds the recommended bed capacity. Even more important is the fact that water mattresses are subject to rupture, which would allow large amounts of water to come into contact with the electrical components of the bed. We recommend not using water mattresses.

Lockout Switch

Whenever a patient or visitor should be restricted from operating the siderail controls, activate the lockout switch located at the head end of the bed (on the main frame). The lockout switch is for the convenience of the staff and the safety of the patient. Use the lockout switch when appropriate.

CPR Release

Only healthcare professionals should use the emergency CPR release. The two release handles are located under the head section of the bed near the seat section.

To activate the CPR release, pull the handle away from the bed. Continue to pull out on the handle until the head section is flat. When this is complete, attend to the patient. The bed will automatically flatten the head and seat sections and reset itself to be ready to use after the emergency.

WARNING:
A bed that is transported with the steer caster locked in an incorrect position can drift from side to side during transport. Personal injury or equipment damage could occur.

WARNING:
Only facility-authorized maintenance personnel should troubleshoot the bed. Troubleshooting by unauthorized personnel could result in personal injury or equipment damage.

WARNING:
Unplug the bed from its power source and disconnect the battery back-up before checking ohms/resistance measurements. Failure to disconnect line voltage to the bed can damage the VOM and cause equipment damage or personal injury.

WARNING:
Refer to your VOM owner's manual for complete and detailed information regarding the operation of your VOM. Failure to do so could result in personal injury or equipment damage.

WARNING:
You must use the 2" x 4" pieces of lumber to support the bed. The bed will fall during this procedure if not supported. Failure to do so could result in personal injury or equipment damage.

WARNING:
Prop up the head section before removing the cotter pins and clevis pins. Failure to do so could result in personal injury or equipment damage.

WARNING:
You must use the 2" x 4" pieces of lumber to support the foot yoke. The foot yoke will fall during this procedure if not supported. Failure to do so could result in personal injury or equipment damage.

WARNING:
The head end of the main frame is supported by the two Trend-Like position gas springs. Any servicing will require that a support device be placed just beneath the head end of the main frame. Failure to do so could result in personal injury or equipment damage.

WARNING:
Do not attempt to remove the gas spring with the head section fully raised and the spring compressed. Lower the head section until the cylinder of the gas spring is free in the slide bracket of the main frame, and support the head section securely before removing the cotter pins and clevis pins. Failure to do so could result in personal injury or equipment damage.

WARNING:
Failure to properly mount the foot section to the yoke latches could result in equipment damage or personal injury.

WARNING:
Failure to properly mount the foot section to the yoke slide brackets could result in equipment damage or personal injury.

WARNING:
Adhere to all electrical safety precautions when servicing the bed's electrical system. Failure to do so could result in personal injury or equipment damage.

WARNING:
Ensure that the bed is stable before removing the caster. Failure to do so could result in personal injury or equipment damage.

WARNING:
Follow the product manufacturer’s instructions. Failure to do so could result in personal injury or equipment damage.

WARNING:
Adhere to the *Infection Control Policies and Procedures* from Hill-Rom.

Failure to do so could result in the spread of infection.

WARNING:
Powered bed mechanisms can cause serious injury. Operate the bed only with persons clear of mechanisms. Failure to do so could result in personal injury or equipment damage.

WARNING:
Unplug the bed from its power source and engage the lockout control during routine maintenance or cleaning. Refer to the *Affinity® Three Birthing Bed and Affinity® Four Birthing Bed User Manual* (USR025) and specific sections in this service manual for additional precautions. Failure to do so could result in personal injury or equipment damage.

WARNING:
Ensure that all electrical/mechanical loads are removed prior to maintenance/repair of the bed's drive system or other mechanical assemblies. Failure to do so could result in personal injury or equipment damage.

WARNING:
Visually inspect the bushings annually. If wear is apparent, replace them. Failure to do so could result in personal injury or equipment damage.

WARNING:
Only facility-authorized personnel should perform preventive maintenance on the bed. Preventive maintenance performed by unauthorized personnel could result in personal injury or equipment damage.

WARNING:
Inspect the pivot point fasteners semi-annually. Failure to do so could result in personal injury or equipment damage.

WARNING:
Use primers with adequate ventilation. Avoid skin contact and

prolonged or repeated breathing of vapors. Do not allow primers to be trapped under rings, watch bands, etc. Observe all directions on the primer can. Failure to do so could result in personal injury.

WARNING:
Avoid excessive or repeated skin contact with the liquid. Repeated contact with the liquid could result in personal injury.

WARNING:
The labor bar is intended to be used in the prescribed manner only. Failure to use this product as outlined may result in personal injury or equipment damage.

WARNING:
Insufficient tightening will allow the cradles to slip and lose their original position. Personal injury could occur.

WARNING:
The supports are intended to be used in the prescribed manner only. Failure to use this product as outlined may result in personal injury or equipment damage.

SHOCK HAZARD:
Unplug the unit from its power source. Failure to do so could result in personal injury or equipment damage.

SHOCK HAZARD:
The voltage in the electrical system presents an electrical shock hazard. Perform standard electrical service procedures before attempting service within the P.C. board enclosure. Adhere to all electrical safety precautions when servicing the bed's electrical system. Failure to do so could result in personal injury or equipment damage.

SHOCK HAZARD:
Do not expose the unit to excessive moisture which would allow liquid to pool. Personal injury or equipment damage could occur.

CAUTION:
Remove the battery if the bed will not be in service for extended periods of time. Failure to do so could result in damage to the life of the battery, or damage to the bed. Contact the appropriate maintenance personnel.

CAUTION:
Do not position the head of the bed against a wall or beneath any fixtures. This is to prevent damage due to the arcing motion of the bed while the bed is being raised and lowered.

CAUTION:
Ensure that the night light is not damaged when the bed is being lowered. Failure to do so could result in equipment damage.

CAUTION:
Do not pull on the mattress material when unfastening the mattress retaining snaps. Unfasten the mattress retaining snaps at the snap location. Failure to do so could result in equipment damage.

CAUTION:
Ensure that the fuse housing is properly oriented for the voltage rating (110-120V or 220-240V) on the bed that you are servicing. Failure to do so could result in equipment damage.

CAUTION:
Do not cut or remove the cable ties that secure the battery leads to the electronics pan. This ensures the proper connection of the batteries during the replacement procedure. Possible equipment damage could occur if the cable ties are removed.

CAUTION:
To prevent component damage, ensure that your hands are clean, and **only** handle a P.C. board by its edges. Failure to do so could result in equipment damage.

CAUTION:
For shipping and storage, place the removed P.C. board in an antistatic protective bag. Failure to do so could result in equipment damage.

CAUTION:
Support the siderail during the removal procedure. Failure to do so could result in equipment damage.

CAUTION:
Ensure that the siderail does not drop when the pins are removed. Failure to do so could result in damage to the wiring going to the siderail.

CAUTION:
Do not use harsh cleansers or detergents such as scouring pads and heavy-duty grease removers, or solvents such as toluene, xylene, and acetone. Equipment damage could occur.

CAUTION:
Ensure that the metal platform is dry before placing the mattress back onto the bed. Failure to do so could result in equipment damage.

CAUTION:
Mattress damage caused by improper draping and/or cleaning procedures is not covered by warranty.

CAUTION:
Standard OB packs and paper drapes will not keep the sheets dry.

CAUTION:
When handling electronic components, wear an antistatic strap. Failure to do so could result in component damage.

CAUTION:
Do not use silicone-based lubricants. Equipment damage could occur.

Product Symbol Definitions

For Affinity® Three Birthing Bed symbol definitions, see table 1-9 on page 1-29.

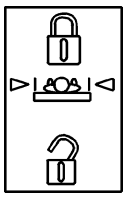
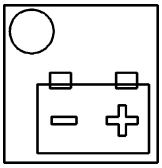
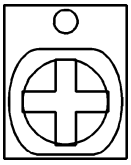
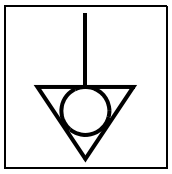
Table 1-9. Product Symbol Definitions

Symbol	Description
	Type B applied part according to EN 60601-1.
IPX2	According to IEC 529
	CAUTION: Consult accompanying documents.
	Conforms to the European Medical Device Directive 93/42/EEC.
	Certified by Underwriters Laboratories Inc.®[a] in accordance with UL2601-1, CAN/CSA C22.2 NO.601.1, EN 60601-1, IEC 601-2-38 and IEC 601-1-2.
	Approval mark from VDE Prüf-und-Zertifizierungsinstitut in accordance with EN 60601-1, IEC 601-2-38, and IEC 601-1-2.
	CPR function—Identifies the release lever that can be used to manually drop the inclined head section, so that cardiopulmonary resuscitation can be performed without delay.
	Trend-Like function

a. Underwriters Laboratories Inc.® is a registered trademark of Underwriters Laboratories Inc.

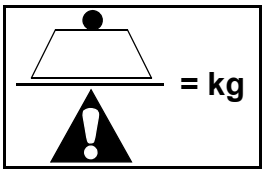
(Continued on next page.)

Table 1-9. Product Symbol Definitions *(cont'd)*

Symbol	Description
	Lockout control label—The switch in the up position indicates the lockout control is **on**. The switch in the down position indicates the lockout control is **off**.
	Lockout control status—when the lockout control status light is on, the lockout function is activated.
	Battery charge status
	Nurse call
	Identifying mains fuse
	Alternating current
	Equipotentiality

(Continued on next page.)

Table 1-9. Product Symbol Definitions *(cont'd)*

Symbol	Description
	Safe working load
	Electric shock hazard
	Keep feet clear of this area. Potential for injury.

Warning and Caution Labels

Figure 1-8. Warning and Caution Labels (Sheet 1 of 3)

45836

45836-00

(Warning symbol, keep feet clear)

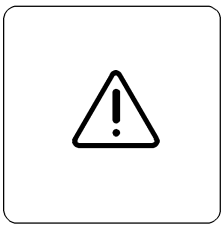
45832

45832-00

(Warning symbol, danger is present)

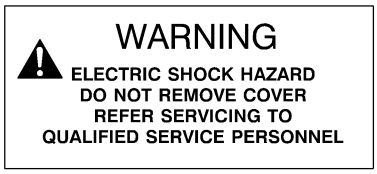
45834

45834-00

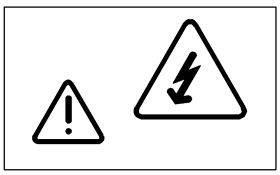


(Warning symbol, danger is present)

67020



67020-00



(Warning symbol, electric shock hazard)

m272a007

Figure 1-9. Warning and Caution Labels (Sheet 2 of 3)

65833

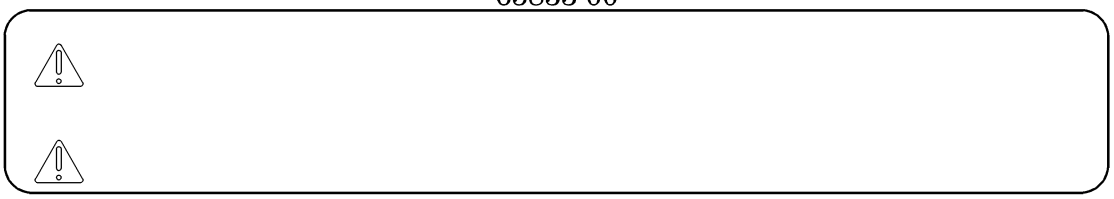
WARNING — POWERED BED MECHANISMS CAN CAUSE SERIOUS INJURY. OPERATE BED ONLY WITH PERSONS CLEAR OF MECHANISMS.

CAUTION — UNPLUG BED DURING SERVICE OR CLEANING. REFER TO SERVICE MANUAL AND IN-SERVICE MANUAL FOR ADDITIONAL PRECAUTIONS.

CAUTION; USE OXYGEN ADMINISTERING EQUIPMENT OF THE NASAL, MASK OR VENTILATOR TYPES.

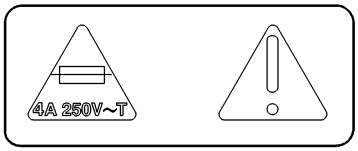
CAUTION; EXTERNAL CIRCUITS PROVIDED BY HOSPITAL FACILITIES AND INTERFACING WITH SIDECOM, HAVE NOT BEEN INVESTIGATED BY UL. PERIODIC TESTS OF LEAKAGE CURRENT SHOULD BE PREFORMED ON THESE CIRCUITS TO VERIFY VALUES ARE WITHIN SAFE AND ACCEPTABLE LIMITS FOR LOCATION OF USE.

65833-00

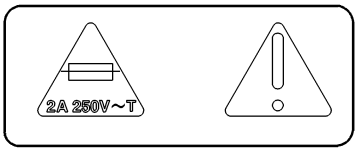


(International)

65831

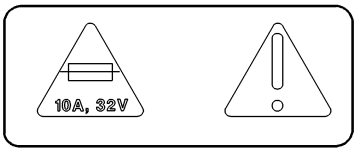


65831-01



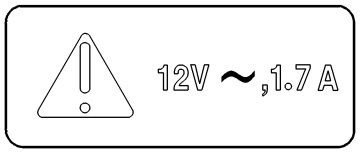
(International)

65831-02

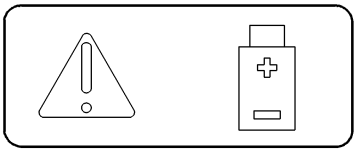


(Autofuse)

65832



66870



(Battery, Caution)

63609

WARNING

FOOT SECTION MUST BE LOCKED IN PLACE.
PULL TO ENSURE LATCH IS ENGAGED.

63609-00

(Warning symbol, foot section must be locked in place)

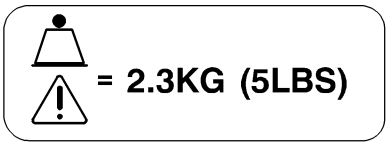
67091

WARNING

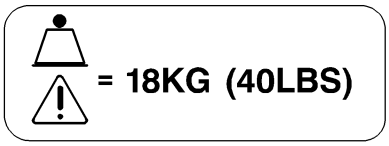
PROPER GROUNDING IS ACHIEVED ONLY WHEN BED IS CONNECTED TO "HOSPITAL GRADE RECEPTACLE"

m272a006

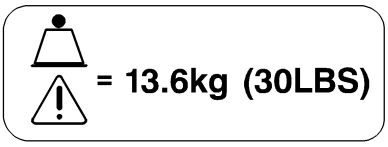
Figure 1-10. Warning and Caution Labels (Sheet 3 of 3)



67090-01 Anesthesia Screen



67090-07 Infusion Support System



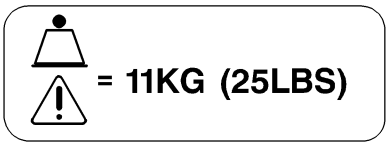
67090-02 Arm Board

67090-08 Labor Bar

67090-03 Attached Calf Support

67090-09 Oxygen Tank Holder

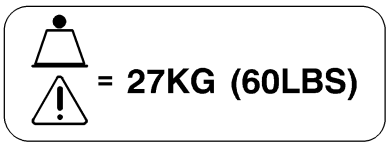
67090-04 Foley Hook Kit



67090-10 Permanent IV Pole

67090-05 Foot Rest Bar

67090-11 Foot Supports



67090-06 Full Leg Supports

m272a008

NOTES:

Chapter 2
Troubleshooting Procedures

2

Getting Started

WARNING:
Only facility-authorized personnel should troubleshoot the bed. Troubleshooting by unauthorized personnel could result in personal injury or equipment damage.

Begin each procedure in this chapter with step 1. Follow the sequence outlined (each step assumes the previous step has been completed). In each step, the normal operation of the product can be confirmed by answering **Yes** or **No** to the statement. Your response will lead to another step in the procedure, a repair analysis procedure (RAP), or a component replacement. If more than one component is listed, replace them in the given order.

To begin gathering information about the problem, start with **Initial Actions**.

To isolate or identify a problem and to verify the repair after completing each corrective action (replacing or adjusting a part, seating a connector, etc.), perform the **Function Checks**.

To verify the repair, perform the **Final Actions** after the Function Checks.

If troubleshooting procedures do not isolate the problem, call Hill-Rom Technical Support at (800) 445-3720 for assistance.

Test Equipment

You will need a digital or analog multimeter (VOM) with fine tip probes to troubleshoot the bed.

WARNING:
Refer to your VOM owner's manual for complete and detailed information regarding the operation of your VOM. Failure to do so could result in personal injury or equipment damage.

Figure 2-1 on page 2-2 represents a common digital VOM. The three basic electrical functions that you will test are alternating current (AC), direct current (DC), and ohms/resistance.

Figure 2-1. VOM

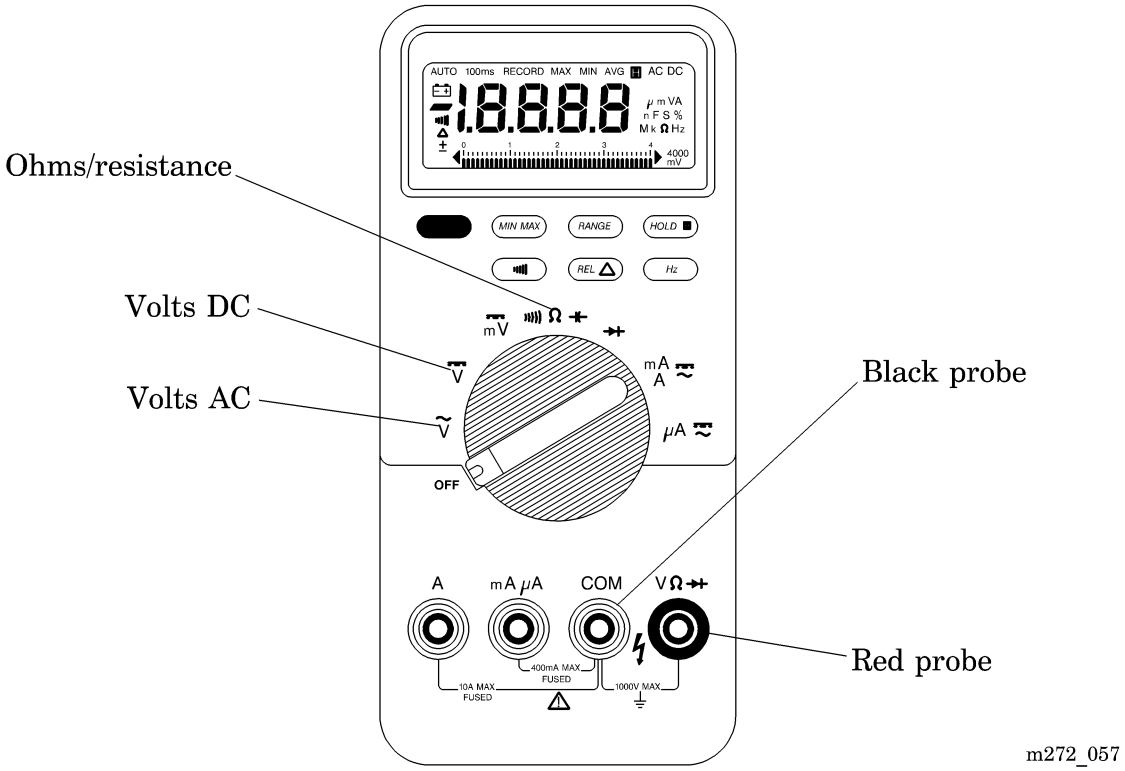


Figure 2-1 on page 2-2 displays the correct connection for the fine tip probes. The red probe plugs into the port marked "V Ω." The black probe plugs into the port marked "COM." The troubleshooting repair analysis procedure (RAP) indicates where on the bed to connect the red probe and black probe.

WARNING:
Unplug the bed from its power source and disconnect the battery back-up before checking ohms/resistance measurements. Failure to disconnect line voltage to the bed can damage the VOM and cause equipment damage or personal injury.

Initial Actions

To gather information from operators concerning problems with the bed, use Initial Actions. Note symptoms or other information concerning the problem that the operator describes. This information helps identify the probable cause.

1. Someone who can explain the problem is available.

   Yes **No**
   ↓ → Go to "Function Checks" on page 2-4.

2. Ask that person to demonstrate or explain the problem. The problem can be duplicated.

   Yes **No**
   ↓ → Go to "Function Checks" on page 2-4.

3. The problem is a result of improper operator action.

   Yes **No**
   ↓ → Go to "Function Checks" on page 2-4.

4. Instruct the operator to refer to the procedures in the *Affinity® Three Birthing Bed and Affinity® Four Birthing Bed User Manual* (USR025). Do the "Function Checks" on page 2-4.

Quick Reference Problem/Solution Matrix

If a problem with the bed system is readily identified, use table 2-1 on page 2-4 to quickly go to the applicable troubleshooting procedure. If the problem is not readily identified, go to "Function Checks" on page 2-4.

Table 2-1. Quick Reference Problem/Solution Matrix

Problem	Solution
Hilow Drive Operation Failures	RAP 2.1
Hilow Up Malfunction	RAP 2.2
Hilow Down Malfunction	RAP 2.3
Head Drive Operation Failures	RAP 2.4
Head Up Malfunction	RAP 2.5
Head Down Malfunction	RAP 2.6
Foot Drive Operation Failures	RAP 2.7
Foot Up Malfunction	RAP 2.8
Foot Down Malfunction	RAP 2.9
Hilow Up Malfunction (When The Foot Section Is Lowered)	RAP 2.10
Brake Caster Malfunction	RAP 2.11
Bed Air Surface Malfunction	RAP 2.12
Night Light Does Not Illuminate	RAP 2.13
Siderail Mechanism Does Not Hold	RAP 2.14
Trend-Like Position Malfunction	RAP 2.15
Battery Backup Malfunction	RAP 2.16
CPR Release Malfunction	RAP 2.17

Function Checks

Function checks determine whether the bed is operating properly. All caregiver control panel functions are available from both the right and left siderails. When checking redundant function controls, activate each of the siderails to determine if the fault is contained in one or both of the siderails.

1. Initial Actions have been performed.

   Yes **No**
   ↓ → Go to “Initial Actions” on page 2-3.

2. The bed is plugged into an appropriate power source.

Yes **No**
↓ → Plug the bed into an appropriate power source.

3. The lockout switch is in the "ON" (unlocked) position before proceeding with the function checks.

   Yes **No**
   ↓ → Place the lockout switch in the "ON" (unlocked) position. Go to step 4.

4. Inspect the siderail cable connections to the logic control P.C. board cable. The cables are connected properly.

   Yes **No**
   ↓ → Connect the siderail cable to the cable from the logic control P.C. board. Go to step 5.

5. Visually inspect the bed for loose connections on cable assemblies and electrical wires. All cable connections and wiring are properly secured.

   Yes **No**
   ↓ → Secure the cable connections and wiring. Go to step 6.

6. Inspect the bed for signs of obvious damage. The bed appears to be all right.

   Yes **No**
   ↓ → Repair the damage, and proceed to the section, "Hilow System Functional Check" on page 2-5.

Hilow System Functional Check

1. Use the bed function controls to place the bed in the following positions:
   - Position the bed in the mid-height position with the hilow function.
   - Raise the foot section to the high position with the foot function.
   - Lower the head to the low position with the head function.
   - Ensure that the bed is out of the Trend-Like position (the sleep surface is level).

2. Momentarily activate the hilow up switch. The bed rises.

   Yes **No**
   ↓ → Go to RAP 2.2.

3. Momentarily activate the hilow down switch. The bed lowers.

   Yes **No**
   ↓ → Go to RAP 2.3.

4. Activate the hilow up and down switch. The hilow motor is free of excessive noise or any mechanical binding/grinding.

   Yes **No**
   ↓ → Go to RAP 2.1.

5. Raise, and then lower the sleep surface using the hilow function. The bed sleep surface stops and does not drift downward or coast.

   Yes **No**
   ↓ → Go to RAP 2.1.

6. Raise the bed to the high position using the hilow function. Determine the hilow up limit setting by measuring at the side of the bed from the floor to the top of the mainframe (see figure 4-5 on page 4-12). The hilow limit (LBU) measurement is 31" ± ½" (79 cm ± 12.7 mm).

   Yes **No**
   ↓ → Adjust the hilow limit switch (LBU) (refer to procedure 4.4). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

7. Lower the bed to the low position using the hilow function. The bed stops at the (LBD) limit stop. The bed height is 16" ± ½" (41 cm ± 12.7 mm).

   Yes **No**
   ↓ → Adjust the hilow limit switch (LBD) (refer to procedure 4.4). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

Trend-Like Position Functional Check

1. Position the bed into a mid height position with the hilow function. Activate the Trend-Like position release handle at the head end of the bed, and place the bed in and out of the Trend-Like position. The bed goes in and out of Trend-Like position smoothly, and the sleep surface is secure when the handle is released:

   Yes **No**
   ↓ → Adjust the Trend-Like position sensing switch (refer to procedure 4.9). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

Head System Functional Check

1. Ensure that the sleep surface is level, and place the bed in the following positions:
   - Place the bed in a mid-height position with the hilow function.
   - Place the head section in a mid-height position with the head function.
2. Momentarily activate the head up switch. The head section rises.

   Yes **No**
   ↓ → Go to RAP 2.5.
3. Momentarily activate the head down switch. The head section lowers.

   Yes **No**
   ↓ → Go to RAP 2.6.
4. Activate the head up or down switch. The head motor is free of excessive noise or any mechanical binding/grinding.

   Yes **No**
   ↓ → Go to RAP 2.4.
5. Raise the head section to the high position with the head up switch. Note the position of the sleep surface. The head section stops and does not drift downward or coast.

   Yes **No**
   ↓ → Go to RAP 2.4.
6. Raise the head section to the high position with the head up switch. Evenly distribute a maximum of 50 lb (23 kg) of weight on the head section of the sleep surface simulating a 50 lb (23 kg) patient. Activate the CPR function by pulling the CPR release lever located at the side of the bed. The head section lowers to a flat position within approximately 7 seconds.

   Yes **No**
   ↓ → Adjust the CPR release cables (refer to procedure 4.8). If this solves the problem, go to “Final Actions” on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

Foot System Functional Check

1. Place the bed in the following positions:
   - Position the bed in the mid-height position with the hilow function.
   - Use the foot function to raise the foot section until the mattress is level with the seat section mattress.
   - Lower the head section to the low position with the head function.
   - Ensure that the bed is out of the Trend-Like position (the sleep surface is level).

2. Press the foot up switch, and activate the foot section. The foot section rises when the foot up switch is activated.

   Yes **No**
   ↓ → Go to RAP 2.8.

3. Press the foot down switch. The foot section lowers when the foot down switch is activated.

   Yes **No**
   ↓ → Go to RAP 2.9.

4. Raise the foot section to the high position using the foot up switch. The top of the foot section stops approximately 2-1/2" (6.35 cm) above the seat section.

   Yes **No**
   ↓ → Adjust the foot limit switch (refer to procedure 4.7). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

5. Lower the foot section to the low position with the foot down switch. The foot drive stops when the foot lift arm is 1/4" (6.4 mm) above the foot end hilow lift arm (see figure 4-9 on page 4-21).

   Yes **No**
   ↓ → Adjust the foot limit switch (refer to procedure 4.7). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

6. Lower the bed to the low position with the hilow down switch. Lower the foot section with the foot down switch. The bed automatically rises from the low position.

   Yes **No**
   ↓ → Go to RAP 2.10.

7. Activate the foot up or down switch. The foot motor is free of excessive noise or any mechanical binding/grinding.

   Yes **No**
   ↓ → Go to RAP 2.7.

Air System Functional Check

1. Press the seat inflate button, and activate the bed air surface. The seat section mattress inflates.

   Yes **No**
   ↓ → Go to RAP 2.12.

2. Press and hold the seat deflate button, and activate the bed air surface. The seat section mattress deflates.

   Yes **No**
   ↓ → Go to RAP 2.12.

3. Press the back inflate button, and activate the bed air surface. The lumbar section inflates.

   Yes **No**
   ↓ → Go to RAP 2.12.

4. Press the back deflate button to activate the bed air surface. The lumbar section deflates.

   Yes **No**
   ↓ → Go to RAP 2.12.

Other Bed Functional Checks

1. The lockout switch locks out the designated inboard/outboard controls when placed in the “OFF” position (locked), and enables the functions when placed in the “ON” position (unlocked). The lockout functions work properly.

   Yes **No**
   ↓ → Replace the faulty rocker switch (refer to procedure 4.26). If this solves the problem, go to “Final Actions” on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

2. Operate all radio, TV, nurse call, and lighting functions in both siderails. All functions operate properly.

   Yes **No**
   ↓ → Replace the P.C. switch board containing the faulty function(s) for caregiver controls (refer to procedure 4.29), or for patient controls (refer to procedure 4.28). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

3. Perform the brake/steer performance check. Place the brake steer pedal into the brake position and then the steer position. The brake and steer functions operate properly.

   Yes **No**
   ↓ → Go to RAP 2.11, and adjust the brake and steer functions (refer to procedure 4.30). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

4. Operate the labor grips on both sides of the bed. The labor grips latch when in the full up position and then release when the release handle is activated.

   Yes **No**
   ↓ → Replace the faulty labor grips (refer to procedure 4.15).

5. Operate the siderail latching mechanism by raising and then lowering the siderail. The siderail latches when in the full up position and lowers slowly when the release handle is activated and allowed to free fall.

   Yes **No**
   ↓ → Replace the faulty siderail assembly (refer to procedure 4.27).

6. Unplug the bed from its power source, and verify that the battery back-up is operating properly by activating bed functions. The battery back-up provides sufficient power to operate the bed functions.

   Yes **No**
   ↓ → Go to RAP 2.16.

7. Go to "Final Actions" on page 2-10.

Final Actions

1. Complete the required preventive maintenance procedures. See "Preventive Maintenance" on page 6-7.

2. Complete all required administrative tasks.

2.1 Hilow Drive Operation Failures

The hilow motor runs, but other problems with the motor are suspected (i.e., it is noisy, it drifts, etc.).

1. Raise and lower the bed with the hilow function. Look for evidence of physical damage to the drive system (i.e., check for a bent motor shaft, loose metal, etc.). The drive system passes inspection.

   Yes **No**
   ↓ → Replace the hilow motor (refer to procedure 4.3). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 2.

2. Inspect the mounting clevis pins and cotter pins on the hilow motor drive. The clevis pins are installed properly.

   Yes **No**
   ↓ → Install the hilow motor clevis pins properly to secure the hilow motor to the bed frame. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 3.

3. Raise and lower the bed under a load condition. The hilow drive runs quietly.

   Yes **No**
   ↓ → Inspect for damage to the hilow motor. Replace if necessary (refer to procedure 4.3). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 4.

4. Using the hilow function, raise and lower the bed. The hilow motor retains its position, and does not drift or coast.

   Yes **No**
   ↓ → Replace the hilow motor (refer to procedure 4.3). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

5. Go to "Final Actions" on page 2-10.

2.2 Hilow Up Malfunction

The hilow motor does not raise the bed when the hilow up switch is activated.

1. The bed is plugged into the appropriate power source, and the lockout switch is **off.**

   Yes **No**
   ↓ → Plug the bed into an appropriate power source and turn the lockout switch off. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 2.

2. Activate the hilow up switch on the opposite siderail. The hilow motor runs.

   Yes **No**
   ↓ → Go to step 4.

3. Activate another bed function switch on the siderail with the non-functioning hilow up switch. The other bed functions work properly.

   Yes **No**
   ↓ → Replace the P.C. switch board containing the faulty function(s) for caregiver controls (refer to procedure 4.30) or for patient controls (refer to procedure 4.29). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 4.

4. Activate the hilow up switch, and listen for an audible relay click. An audible clicking sound can be heard.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 5.

5. Allow the hilow motor to cool. Activate the hilow motor up switch. The hilow motor runs.

   Yes **No**
   ↓ → Replace the hilow motor (refer to procedure 4.3). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 7.

6. Go to "Final Actions" on page 2-10.

7. Set your VOM to measure V DC. At the logic control P.C. board connector P15, place your black probe into pin 1 (black wire) and your red probe into pin 2 (blue wire). Press the hilow up switch. The voltage is between 25V DC and 30V DC.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 8.

8. Replace the hilow motor (refer to procedure 4.3).

   This solves the problem.

   Yes **No**
   ↓ → Call Hill-Rom Technical Support at (800) 445-3720.

9. Go to "Final Actions" on page 2-10.

2.3 Hilow Down Malfunction

The hilow motor does not lower the bed when the hilow down switch is activated.

1. The bed is plugged into the appropriate power source, and the lockout switch is **off.**

   Yes **No**
   ↓ → Plug the bed into an appropriate power source and turn the lockout switch off. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 2.

2. Activate the hilow down switch on the opposite siderail. The hilow motor runs.

   Yes **No**
   ↓ → Go to step 4.

3. Activate another bed function switch on the siderail with the non-functioning hilow down switch. The other bed functions work properly.

   Yes **No**
   ↓ → Replace the P.C. switch board containing the faulty function(s) for caregiver controls (refer to procedure 4.30) or for patient controls (refer to procedure 4.29). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 4.

4. Activate the hilow down switch, and listen for an audible relay click. An audible clicking sound can be heard.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 5.

5. Allow the hilow motor to cool. Activate the hilow motor down switch. The hilow motor runs.

   Yes **No**
   ↓ → Replace the hilow motor (refer to procedure 4.3). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 7.

6. Go to "Final Actions" on page 2-10.

7. Set your VOM to measure V DC. At the logic control P.C. board connector P15, place your black probe into pin 1 (black wire) and your red probe into pin 2 (blue wire). Press the hilow down switch. The voltage is between 25V DC and 30V DC.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 8.

8. Replace the hilow motor (refer to procedure 4.3).

   This solves the problem.

   Yes **No**
   ↓ → Call Hill-Rom Technical Support at (800) 445-3720.

9. Go to "Final Actions" on page 2-10.

2.4 Head Drive Operation Failures

The hilow motor runs, but other problems with the motor are suspected (i.e., it is noisy, it drifts, etc.).

1. Raise and lower the head section with the head function. Look for evidence of physical damage to the drive system (i.e., check for a bent motor shaft, loose metal, etc.). The drive system passes inspection.

   Yes **No**
   ↓ → Replace the head motor (refer to procedure 4.5). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 2.

2. Inspect the mounting clevis pins and cotter pins on the head motor drive. The clevis pins are installed properly.

   Yes **No**
   ↓ → Install the head motor clevis pins properly to secure the head motor to the bed frame. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 3.

3. Raise and lower the head section under a load condition. The head drive runs quietly.

   Yes **No**
   ↓ → Inspect for damage to the head motor. Replace if necessary (refer to procedure 4.5). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 4.

4. Using the head function, raise and lower the head section. The head motor retains its position, and does not drift or coast.

   Yes **No**
   ↓ → Replace the head motor (refer to procedure 4.5). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

5. Go to "Final Actions" on page 2-10.

2.5 Head Up Malfunction

The head motor does not raise the head section when the head up switch is activated.

1. The bed is plugged into the appropriate power source, and the lockout switch is **off.**

   Yes **No**
   ↓ → Plug the bed into an appropriate power source and turn the lockout switch off. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 2.

2. Check the CPR release handles on either side of the bed. The CPR handles are in the proper position, and no sheets or blankets are caught between the head section and the CPR release handle causing the CPR release to actuate.

   Yes **No**
   ↓ → Remove the sheet or blanket that is causing the CPR release to actuate. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 3.

3. Activate the head up switch on the opposite siderail. The head motor runs.

   Yes **No**
   ↓ → Go to step 5.

4. Activate another bed switch on the siderail with the non-functioning head up switch. The other bed functions work properly.

   Yes **No**
   ↓ → Replace the P.C. switch board containing the faulty function(s) for caregiver controls (refer to procedure 4.30) or for patient controls (refer to procedure 4.29). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 5.

5. Activate the head up switch, and listen for an audible relay click. An audible clicking sound can be heard.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 6.

6. Allow the head motor to cool. Activate the head motor up switch. The head motor runs.

   Yes **No**
   ↓ → Replace the head motor (refer to procedure 4.5). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 8.

7. Go to "Final Actions" on page 2-10.

8. Set your VOM to measure V DC. At the logic control P.C. board connector P4, place your black probe into pin 1 (brown wire) and your red probe into pin 2 (blue wire). Press the head up switch. The voltage is between 25V DC and 30V DC.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 9.

9. Replace the head motor (refer to procedure 4.5).

   This solves the problem.

   Yes **No**
   ↓ → Call Hill-Rom Technical Support at (800) 445-3720.

10. Go to "Final Actions" on page 2-10.

2.6 Head Down Malfunction

The head motor does not lower the head section when the head down switch is activated.

1. The bed is plugged into the appropriate power source, and the lockout switch is **off.**

   Yes **No**
   ↓ → Plug the bed into an appropriate power source and turn the lockout switch off. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 2.

2. Activate the head down switch on the opposite siderail. The head motor runs.

   Yes **No**
   ↓ → Go to step 4.

3. Activate another bed switch on the siderail with the non-functioning head down switch. The other bed functions work properly.

   Yes **No**
   ↓ → Replace the P.C. switch board containing the faulty function(s) for caregiver controls (refer to procedure 4.30) or for patient controls (refer to procedure 4.29). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 4.

4. Activate the head down switch, and listen for an audible relay click. An audible clicking sound can be heard.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 5.

5. Allow the head motor to cool. Activate the head down switch. The head motor runs.

   Yes **No**
   ↓ → Replace the head motor (refer to procedure 4.5). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 7.

6. Go to "Final Actions" on page 2-10.

7. Set your VOM to measure V DC. At the logic control P.C. board connector P4, place your black probe into pin 1 (brown wire) and your red probe into pin 2 (blue wire). Press the head down switch. The voltage is between 25V DC and 30V DC.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 8.

8. Replace the head motor (refer to procedure 4.5).

   This solves the problem.

   Yes **No**
   ↓ → Call Hill-Rom Technical Support at (800) 445-3720.

9. Go to "Final Actions" on page 2-10.

2.7 Foot Drive Operation Failures

The foot motor runs, but other problems with the motor are suspected (i.e., it is noisy, it drifts, etc.).

1. Raise and lower the foot section with the foot function. Look for evidence of physical damage to the drive system (i.e., check for a bent motor shaft, loose metal, etc.). The drive system passes inspection.

   Yes **No**
   ↓ → Replace the foot motor (refer to procedure 4.6). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 2.

2. Inspect the mounting clevis pins and cotter pins on the foot motor drive. The clevis pins are installed properly.

   Yes **No**
   ↓ → Install the foot motor clevis pins properly to secure the foot motor to the bed frame. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 3.

3. Raise and lower the foot section under a load condition. The foot drive runs quietly.

   Yes **No**
   ↓ → Inspect for damage to the foot motor. Replace if necessary (refer to procedure 4.6). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 4.

4. Using the foot function, raise the foot section up and down. The foot motor retains its position, and does not drift or coast.

   Yes **No**
   ↓ → Replace the foot motor (refer to procedure 4.6). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

5. Go to "Final Actions" on page 2-10.

2.8 Foot Up Malfunction

The foot motor does not raise the foot section when the foot up switch is activated.

1. The bed is plugged into the appropriate power source, and the lockout switch is **off.**

   Yes **No**
   ↓ → Plug the bed into an appropriate power source and turn the lockout switch off. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 2.

2. Activate the foot up switch on the opposite siderail. The foot motor runs.

   Yes **No**
   ↓ → Go to step 4.

3. Activate another bed switch on the siderail with the non-functioning foot up switch. The other bed functions work properly.

   Yes **No**
   ↓ → Replace the P.C. switch board containing the faulty function(s) for caregiver controls (refer to procedure 4.30) or for patient controls (refer to procedure 4.29). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 4.

4. Activate the foot up switch, and listen for an audible relay click. An audible clicking sound can be heard.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 5.

5. Allow the foot motor to cool. Activate the foot up switch. The foot motor runs.

   Yes **No**
   ↓ → Replace the foot motor (refer to procedure 4.6). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 7.

6. Go to "Final Actions" on page 2-10.

7. Set your VOM to measure V DC. At the logic control P.C. board connector P6, place your black probe into pin 1 (black wire) and your red probe into pin 2 (blue wire). Press the foot up switch. The voltage is between 25V DC and 30V DC.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 8.

8. Replace the foot motor (refer to procedure 4.6).

   This solves the problem.

   Yes **No**
   ↓ → Call Hill-Rom Technical Support at (800) 445-3720.

9. Go to "Final Actions" on page 2-10.

2.9 Foot Down Malfunction

The foot motor does not lower the foot section when the foot down switch is activated.

1. The bed is plugged into the appropriate power source, and the lockout switch is **off.**

   Yes **No**
   ↓ → Plug the bed into an appropriate power source and turn the lockout switch off. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 2.

2. Activate the foot down switch on the opposite siderail. The foot motor runs.

   Yes **No**
   ↓ → Go to step 4.

3. Activate another bed switch on the siderail with the non-functioning foot down switch. The other bed functions work properly.

   Yes **No**
   ↓ → Replace the P.C. switch board containing the faulty function(s) for caregiver controls (refer to procedure 4.30) or for patient controls (refer to procedure 4.29). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 4.

4. Activate the foot down switch, and listen for an audible relay click. An audible clicking sound can be heard.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 5.

5. Allow the foot motor to cool. Activate the foot down switch. The foot motor runs.

   Yes **No**
   ↓ → Replace the foot motor (refer to procedure 4.6). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 7.

6. Go to "Final Actions" on page 2-10.

7. Set your VOM to measure V DC. At the logic control P.C. board connector P6, place your black probe into pin 1 (black wire) and your red probe into pin 2 (blue wire). Press the foot down switch. The voltage is between 25V DC and 30V DC.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 8.

8. Replace the foot motor (refer to procedure 4.6).

   This solves the problem.

   Yes **No**
   ↓ → Call Hill-Rom Technical Support at (800) 445-3720.

9. Go to "Final Actions" on page 2-10.

2.10 Hilow Up Malfunction (When The Foot Section Is Lowered)

The hilow function (or motor) fails to automatically raise the bed from the low position when the foot section is lowered to its lowest point.

1. Activate the hilow function from the siderails and pendant control. The hilow function works properly.

   Yes **No**
   ↓ → Go to "Hilow Up Malfunction" on page 2-12 or "Hilow Down Malfunction" on page 2-14. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 2.

2. Put the bed into the low position. Lower the foot section to the low position. The bed automatically rises.

   Yes **No**
   ↓ → Check the hilow and foot limit switches. Refer to "Hilow Limit Switch" on page 4-11 or "Foot Limit Switch" on page 4-21. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

3. Go to "Final Actions" on page 2-10.

2.11 Brake Caster Malfunction

1. The brake caster pedal locks in the brake position when you push on it with your foot.

   Yes **No**
   ↓ → Inspect the caster for excessive wear. If necessary, replace the damaged caster (refer to procedure 4.32). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 2.

2. The casters lock in the brake position and do not roll or rotate when you push in the brake pedal.

   Yes **No**
   ↓ → Adjust the caster assembly (refer to procedure 4.32). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 3.

3. Another part of the bed interferes with the brake mechanism.

   Yes **No**
   ↓ → If the brakes still do not work, call Hill-Rom Technical Support at (800) 445-3720.

4. Take appropriate actions to eliminate the interference.

   This solves the problem.

   Yes **No**
   ↓ → Call Hill-Rom Technical Support at (800) 445-3720.

5. Go to "Final Actions" on page 2-10.

2.12 Bed Air Surface Malfunction

The bed air surface does not function properly.

1. Activate all bed air surface switches in both siderails. Only one switch does not work.

   Yes **No**
   ↓ → Go to step 4.

2. Replace the P.C. switch board containing the faulty function for caregiver controls (refer to procedure 4.29) or for patient controls (refer to procedure 4.28). This solves the problem.

   Yes **No**
   ↓ → Go to step 4.

3. Go to "Final Actions" on page 2-10.

4. Activate all bed air surface switches in both siderails. All of the switches in one siderail work while several of the switches in the opposite siderail fail.

   Yes **No**
   ↓ → Go to step 7.

5. Replace the P.C. switch board(s) containing the faulty functions for caregiver controls (refer to procedure 4.29) or for patient controls (refer to procedure 4.28). This solves the problem.

   Yes **No**
   ↓ → Go to step 7.

6. Go to "Final Actions" on page 2-10.

7. Activate one of the bed air function switches. Audible clicks of the relay from the air system control board can be heard.

   Yes **No**
   ↓ → Go to step 9.

8. Go to step 12.

9. Set your VOM to measure V DC. At the logic control P.C. board connector P8, probe pins 7, 8, 9, 11, and 12 while pressing each siderail air function button (see table 2-2 on page 2-29). The pin voltages are correct.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

Table 2-2. Three Station Manifold I/O Signal Reference
Logic Control P.C. Board Connector P8

Input Command: Mattress Function											
Output Signal	**Pin No.**	**Wire Color**	**SF**	**SS**	**BF**	**BS**	**AI**	**BF/ SF**	**BS/ SS**	**BF/ SS**	**BS/SF**
Pump	11	GRN	X		X	X	X	X			
Lum	7	BLU			X	X		X	X		
Seat	8	VIO	X	X			X	X	X		
In/out	9	RED		X		X			X		
Super-visory	12	ORG	X	X	X	X	X	X	X		
X= ON= 5V DC (approximately)											
Legend: **SF**= Seat firm **SS**= Seat soft **BF**= Back firm **BS**= Back soft **AI**= Auto inflate											

10. Replace the cable or connectors from the logic control P.C. board to the air system control P.C. board. This solves the problem.

    Yes **No**
    ↓ → Call Hill-Rom Technical Support at (800) 445-3720.

11. Go to “Final Actions” on page 2-10.

12. Disconnect the air connectors at the seat section. Activate the back inflate button, and test for air pressure on the patients left-hand side. Activate the back deflate button, and test for air release on the patient’s left-hand side. Activate the seat inflate button, and test for air pressure on the patients right hand side. The air pressure and air release is correct at both of the connectors.

    Yes **No**
    ↓ → Go to step 15.

13. Ensure that all hoses and bladders are free of kinks, pinching, and leaks. This solves the problem.

    Yes **No**
    ↓ → Go to step 15.

14. Go to “Final Actions” on page 2-10.

15. Pressure and suction are present at the connectors for all functions.

    Yes **No**
    ↓ → Go to step 17.

16. Go to step 27.

17. Press any bed inflate button. The pump runs.

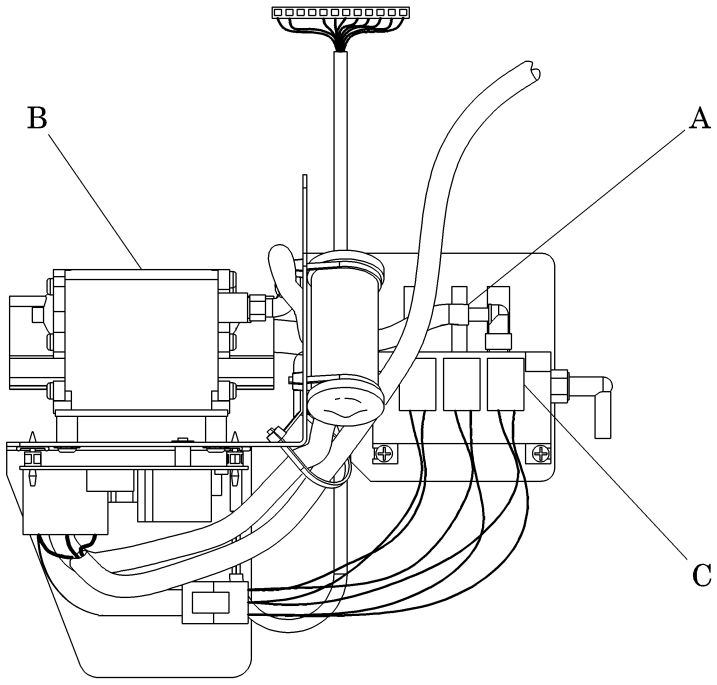
    Yes **No**
    ↓ → Go to step 20.

18. Disconnect the air line (A) from the air compressor (B) to the top of the manifold (C) (see figure 2-2 on page 2-30). Press any bed inflate button to activate the pump. The air compressor creates suction in the air line.

    Yes **No**
    ↓ → Replace the air compressor (refer to procedure 4.20). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 27.

19. Go to step 27.

Figure 2-2. Air System



m272_039

20. Set your VOM to measure V AC. At the air system control P.C. board connector P19, probe pin 1 (black) and pin 3 (white). The voltage is approximately 115V AC.

NOTE:
For high voltage checks, do not unplug the connectors.

NOTE:
Mains power is 120V AC if domestic, 230V AC if European.

Yes **No**
↓ → Go to step 24.

21. Set your VOM to measure V AC. At the air system control P.C. board connector P20, probe pin 1 (black) and pin 3 (white). Press any bed inflate button. The voltage is approximately 115V AC.

NOTE:
For high voltage checks, do not unplug the connectors.

NOTE:
Mains power is 120V AC if domestic, 230V AC if European.

Yes **No**
↓ → Replace the air system control P.C. board (refer to procedure 4.20). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 27.

22. Replace the air compressor (refer to procedure 4.20). This solves the problem.

Yes **No**
↓ → Go to step 27.

23. Go to "Final Actions" on page 2-10.

24. Set your VOM to measure V AC. At the logic control P.C. board connector P16, probe pin 1 (black) and pin 3 (white). The voltage is approximately 115V AC if domestic, or 230V AC if European.

NOTE:
For high voltage checks, do not unplug the connectors.

NOTE:
Mains power is 120V AC if domestic, 230V AC if European.

Yes **No**
↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 27.

25. Replace the cable or connectors between the logic control P.C. board and the air system control P.C. board. This solves the problem.

Yes **No**
↓ → Go to step 27.

26. Go to "Final Actions" on page 2-10.

27. Set your VOM to measure V AC. At the air system control P.C. board connector P21, probe pin 1 (white) and at the air system control P.C. board connector P22, probe the pins listed in table 2-3 on page 2-33 while pressing the appropriate siderail air function buttons (see table 2-3 on page 2-33). The voltage is approximately 115V AC.

NOTE:
For high voltage checks, do not unplug the connectors.

NOTE:
Mains power is 120V AC if domestic, 230V AC if European.

NOTE:
See "3-Station Manifold I/O Signal Reference" table 2-2 on page 2-29.

Yes **No**
↓ → Replace the air system control P.C. board (refer to procedure 4.22). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

Table 2-3. Solenoid Test—Air System Control P.C. Board Connector P22

Pin#	Wire Color	Press Function
1	Yellow or black	Back firm
2	Brown	Seat firm
5	Red	Seat soft
6	Violet	Seat soft
8	Pink	Seat soft
9	Tan	Seat firm

28. Set your VOM to measure V DC. At the logic control P.C. board connector P8, probe pins 7, 8, 9, 11, and 12 while pressing each siderail air function button (see table 2-2 on page 2-29). The pin voltages are correct.

    Yes **No**
    ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

29. Replace the cable or connectors from the logic control P.C. board to the air system control P.C. board.

    This solves the problem.

    Yes **No**
    ↓ → Call Hill-Rom Technical Support at (800) 445-3720.

30. Go to "Final Actions" on page 2-10.

2.13 Night Light Does Not Illuminate

1. The night light comes on when the ambient light dims.

   Yes **No**
   ↓ → Replace the lamp bulb or fixture if damaged (refer to procedure 4.13). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 2.

2. Verify that the photocell functions. The night light comes on when the ambient light dims.

   Yes **No**
   ↓ → Replace the photocell. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 3.

3. The system functions normally.

   Yes **No**
   ↓ → Verify that the night light lamp cable is plugged into the logic control P.C. board connector, P1. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 4.

4. The system functions normally.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

5. Go to "Final Actions" on page 2-10.

2.14 Siderail Mechanism Does Not Hold

1. From the low (stow) position, raise the siderail by pulling the siderail up until it clicks in the locked position. It rises and clicks into place.

   Yes **No**
   ↓ → Inspect for obstructions, missing hardware, or loose fasteners. If found, replace the siderail. See "Siderail Assembly" on page 4-67. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 2.

2. Grasp the top of the siderail, and push and pull firmly on the siderail. The siderail remains latched in the locked position.

   Yes **No**
   ↓ → Inspect for obstructions or loose fasteners. If found, replace the siderail. See "Siderail Assembly" on page 4-67. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 3.

3. Stow the siderail as follows: grasp and pull the release handle out, and allow the siderail to swing down in a controlled, dampened, manner to the fully stowed position. The siderail goes down into the stored position.

   Yes **No**
   ↓ → Inspect for obstructions in the center arm, loose fasteners, missing spring, or binding. If found, replace the siderail. See "Siderail Assembly" on page 4-67. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 4.

4. Another part of the bed interferes with the siderail.

   Yes **No**
   ↓ → If the siderail still does not work properly, call Hill-Rom Technical Support at (800) 445-3720.

5. Take appropriate actions to eliminate the interference.

   This solves the problem.

   Yes **No**
   ↓ → Call Hill-Rom Technical Support at (800) 445-3720.

6. Go to "Final Actions" on page 2-10.

2.15 Trend-Like Position Malfunction

1. If unable to place the bed in the Trend-Like position, press the hilow up switch to raise the bed to a higher position. Push down on the Trend-Like position release handle. The head end is 8° below the foot end.

   Yes **No**

   ↓ → Verify that the Trend-Like position release handles are properly adjusted and functional. See “Trend-Like Position Sensing Switch” on page 4-27 for access and safety precautions in servicing the Trendelenburg features. If this solves the problem, go to “Final Actions” on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

2. Go to “Final Actions” on page 2-10.

2.16 Battery Back-up Malfunction

1. The battery has been properly charged and is providing power to the bed.

   Yes **No**
   ↓ → Charge the battery. Refer to "Battery Back-up" on page 1-4. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 2.

2. Using the VOM, check the battery fuse for electrical continuity. The battery fuse is in good condition.

   Yes **No**
   ↓ → Replace the battery fuse (refer to procedure 4.19). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 3.

3. Visually inspect for loose connections on cable assemblies and electrical wires. All cable connections and wiring are properly secured.

   Yes **No**
   ↓ → Secure the cable connections and wiring. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 4.

4. Set your VOM to measure V DC. At the logic control P.C board, connect the ground lead of the VOM to the negative side of C1 and the positive lead to the positive side of D15 (the side **without** a silver band). The voltage is between 27.6 and 28.0 V DC.

   Yes **No**
   ↓ → Adjust the battery charge circuit (refer to procedure 4.19). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 5.

5. Set your VOM to measure V AC. At the logic control P.C board connector P2, probe pin 1 (yellow) and pin 2 (red). The voltage is approximately 12V AC or 24V AC.

   Yes **No**
   ↓ → Replace the transformer assembly (refer to procedure 4.24). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 6.

6. Set your VOM to measure V DC. Probe connector P5 at the logic control P.C. board. The voltage is between 25 V DC to 30V DC.

   Yes **No**
   ↓ → Replace the logic control P.C. board (refer to procedure 4.23). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, continue to step 7.

7. Replace the two batteries in the battery back-up assembly (refer to procedure 4.19). This solves the problem.

   Yes **No**
   ↓ → Call Hill-Rom Technical Support at (800) 445-3720.

   Go to "Final Actions" on page 2-10.

2.17 CPR Release Malfunction

1. Pull and hold the CPR release handle. The head section goes into the full flat position. (When unoccupied, the head section may require slight downward hand pressure to rotate completely into the full flat position.)

   Yes **No**
   ↓ → Check the adjustment of the CPR function (refer to procedure 4.8). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 2.

2. Visually inspect the head drive motor assembly for damage or missing parts. The head drive motor assembly is in good working condition.

   Yes **No**
   ↓ → Replace the head drive motor assembly (refer to procedure 4.5). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 3.

3. Another part of the bed interferes with the CPR release mechanism.

   Yes **No**
   ↓ → If the head section still does not release, call Hill-Rom Technical Support at (800) 445-3720.

4. Take appropriate actions to eliminate the interference.

   This solves the problem.

   Yes **No**
   ↓ → Call Hill-Rom Technical Support at (800) 445-3720.

5. Go to "Final Actions" on page 2-10.

NOTES:

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Chapter 3
Theory of Operation

Electrical System

The following wiring diagrams detail the electrical circuits and the P.C. boards on the bed. Use these diagrams as troubleshooting aids.

Figure 3-1. Bed Wiring Diagram—P/N 63993

Refer to fold-out FO 3-1 and FO 3-2 at the rear of this manual.

Figure 3-2. Logic Control P.C. Board—P/N 68121 Top